



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/814,714

03/31/2004

Heinz H. Busta

100067

9863

29050

7590

05/05/2006

STEVEN WESEMAN
ASSOCIATE GENERAL COUNSEL, I.P.
CABOT MICROELECTRONICS CORPORATION
870 NORTH COMMONS DRIVE
AURORA, IL 60504

EXAMINER

VIJAYAKUMAR, KALLAMBELLA M

ART UNIT

PAPER NUMBER

1751

DATE MAILED: 05/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/814,714

Applicant(s)

BUSTA ET AL.

Examiner

Kallambella Vijayakumar

Art Unit

1751

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) 29-35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Applicant's election without traverse of Group-I, Claims 1-28 in the reply filed on 02/15/2006 is acknowledged. Accordingly, claims 29-35 are withdrawn from consideration.

The examiner has considered the IDS filed 03/31/2004 and 06/18/2004.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 10-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 10 and 11 contain the trademark/trade name "**flowable oxide**." Where a trademark or trade name is used in a claim as a limitation to identify or describe a particular material or product, the claim does not comply with the requirements of 35 U.S.C. 112, second paragraph. See *Ex parte Simpson*, 218 USPQ 1020 (Bd. App. 1982). The claim scope is uncertain, since the trademark or trade name cannot be used properly to identify any particular material or product. A trademark or trade name is used to identify a source of goods and not the goods themselves. Thus, a trademark or trade name does not identify or describe the goods associated with the trademark or trade name. In the present case, the trademark/trade name is used to identify/describe "**hydrogen silsesquioxide**" and, accordingly, the identification/description is indefinite.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Art Unit: 1751

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-2, 5-8, 10, 17-20 and 22-23 are rejected under 35 U.S.C. 102(b) as being anticipated by van Beek et al (J. Apl. Poly. Sci. 1962, 24, Pg 651-655).

Van Beek et al teach a field emission composition containing a dispersion of carbon black in vulcanized natural rubber containing silica and silicate fillers (Title, Introduction).

With regard to claims 5-7, the prior art composition is identical to that by the applicants, and the examiner asserts that the art composition will be identical to that made using the components under specific process conditions of the applicants.

With regard to claims 8, prior art composition is identical to that by the applicants, and identical compositions have identical properties.

With regard to claims 10 and 17, the prior art teaches silica and silicate-type fillers.

With regard to process claims 18-19 and 22-23, the prior art teaches milling the components followed by vulcanization.

With regard to claim 20, the prior art teaches measuring the C-V characteristics of the samples (Pg 651; current-voltage characteristics). All the limitations of the instant claims are met.

The reference is anticipatory.

2. Claims 1, 4-8, 13-14 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Karbutov et al (IEEE, 2001, pp 277-278).

Karbutov et al teach nanocomposite filed emitters containing BN/diamond/SiO₂ <matrix> and polycarbon <carbon black > with low-field emission (Pg-277, Abstract, Fig 1-2). Fig-2 meets the limitation of the pattern in claim-4 and the property in claim-8, and structure in claim-13.

With regard to claims 5-7, the prior art composition is identical to that by the applicants, and the examiner asserts that the art composition will be identical to that made using the components under specific process conditions of the applicants.

Art Unit: 1751

With regard to claim 14, the examiner asserts that the prior art composition and structure will be identical to that formed by the instant claimed process step.

With regard to claim 17, the prior art teaches a silica/carbon nanocomposite (Fig-4). All the limitations of the instant claims are met.

The reference is anticipatory.

3. Claims 1-2, 5-9, 12-15, 18, 20 and 22-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Blanchet-Fincher et al (US 5,948,465).

Blanchet-Fincher et al teach the composition and making of field emitter comprising carbon soot, methanol and polyethylene oxide <polymer binder> coated over an electrically conductive surface (Col-2, Ln 32-36, col-2, Ln 65 –Col-3, Ln-3; Col-3, Ln 51-52).

With regard to claims 5-7, the prior art composition is identical to that by the applicants, and the examiner asserts that the art composition will be identical to that made using the components under specific process conditions of the applicants.

With regard to claims 8, prior art composition is identical to that by the applicants, and identical compositions have identical properties.

With regard to claim 9, the prior art teaches carbon soot that is identical to the soot from diesel/fuel-oil/hydrocarbon source.

With regard to claims 12-15, the prior art teaches a field emitter cathode over a conductive substrate that is planar, fiber, a wire or a SS flex screen, wherein the components are identical to that by the applicants, and the examiner asserts that the prior art composition and structure will be identical to that formed by the instant claimed process step in claim-14.

With regard to process steps 18, 20 and 22-28, the prior art teaches mixing the components, coating a conductive substrate including planar, wire and flexible stainless steel screen, and drying the coated film forming the filed emitter wherein the art components and the process steps are identical to that by the applicants (Col-2, Ln 13-31; Col-3, Ln 53-Col-4, Ln 9; Col-5, Ln 36-40; Col-6, Ln 37-40; Col-7, Example-

Art Unit: 1751

1). The prior art further teaches measuring the emission current as a function of applied voltage (Col-6, Ln 48-57). All the limitations of the instant claims are met.

The reference is anticipatory.

4. Claims 1-8, 10-19 and 21-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Tuck (WO 02/03413).

The US 2004/0025732 is being used as the equivalent of WO 02/03413 in the present rejection.

Tuck et al teach a field emission device containing an array of field electron emitters formed by printing ink containing graphite, carbon black, silica and a binder such as PVA or CMC dispersed in a solvent (Para 0106, 0016-0024, 0039-0040; 0056-0070; 0089).

With regard to claim 2, the prior art teaches a binder of PVA or CMC.

With regard to claims 3, 10-11 and 16, the prior art teaches a polysiloxane such as silsesquioxane polymer (Para 0059-0060; 0192) (See Felter et al, US 6,007,963, Col-5, Ln 18-23, 50-67). The data sheets for FOx and Accuglass show these to be siloxanes that meet the limitation of photoresist and DLC precursor in the claims.

With regard to claim-4, the prior art teaches screen printing the composition over a conductive surface (Para 0022).

With regard to claims 5-7, the prior art composition and its components are identical to that by the applicants, and the examiner asserts that the art composition will be identical to that made using the components under specific process conditions of the applicants.

With regard to claims 8, prior art composition is identical to that by the applicants, and identical compositions have identical properties.

With regard to claims 12-15, the prior art teaches a composition containing a coating over a porous or planar surface forming the field emitter (Para 0089, 0113), and the examiner asserts that the prior art composition and structure will be identical to that formed by the instant claimed process step in claim-14.

With regard to claim 17, the prior art teaches silica sol-gel or silica filler (Para 0056, 0040).

Art Unit: 1751

With regard to method claims 18-19 and 21-28, the prior art teaches mixing the components that are identical to that claimed by the applicants forming an ink and coating a conductive substrate by spin coating the composition followed by drying/curing (Para 0145; 0283-0287) thus forming a field emitter over a conductive substrate that is either porous or planar surface. All the limitations of the instant claims are met.

The reference is anticipatory.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Art Unit: 1751

1. Claims 3, 10-11, 16-17, 19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blanchet-Fincher et al (US 5,948,465) in view of Tuck (WO 02/03413).

The disclosure on the composition and process of making the field emitter as set forth in rejection-3 under 35 USC 102(b) is herein incorporated.

The prior art fails to teach the specific binders in the composition of the filed emitter and a process of making the filed emitters containing these specific binders.

In the analogous art, Tuck teaches the use of silica sol-gel, polysiloxane, silsequioxane and CMC as binders in forming field emitters containing carbon black (Para 0056-0059, 0068; 0070).

It would be obvious to a person of ordinary skill in the art to combine the prior art teachings to substitute the binders of Blanchet-Fincher et al with the binders of Tuck as functional equivalents with reasonable expectation of success, because the species of CMC binder of Fincher et al is encompassed by the polymer binders of Tuck et al for compositions containing carbon black, and the combined prior art is suggestive of the claimed composition and the process step.

2. Claims 9 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tuck (WO 02/03413) in view of Blanchet-Fincher et al (US 5,948,465).

The disclosure on the composition of filed emitter by Tucker et al as set forth in rejection-4 under 35 USC 102(b) is herein incorporated.

Tuck fails to teach the use of carbon soot in the composition per claim-9 or measuring the field emitter properties per claim-20.

In the analogous art, Blanchet-Fincher et al teach carbon emitters comprising powders of graphite, micronized coke, polycrystalline diamond and carbon soot dispersed in a binder (Col-2, Ln 32-36) and measuring the filed emitter properties as a function of applied voltage (Col-6, Ln 38-47).

It would be obvious to a person of ordinary skill in the art to combine the prior art teachings to substitute the carbon black of Tucker et al with carbon soot of Blanchet-Fincher et al as functional equivalents with reasonable expectation of success, because the carbons of Tuck are encompassed by

Art Unit: 1751

the genus of carbons by Fincher et al and the combined prior art is suggestive of the claimed composition.

It would be obvious to a person of ordinary skill in the art to measure the properties of the filed emitter as a routine quality control function of the process control to optimize the process steps as shown by the measurements by Fincher et al with reasonable expectation of success.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kallambella Vijayakumar whose telephone number is 571-272-1324. The examiner can normally be reached on 8.30-6.00 Mon-Thu, 8.30-5.00 Alt Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas McGinty can be reached on 571-272-1029. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMV
April 21, 2006.


Mark Kopec
Primary Examiner